UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/905,761	07/13/2001	Gaylon S. Campbell	8050	3577

7590 01/29/2004

L. GRANT FOSTER
HOLLAND & HART LLP
555-17TH STREET, SUITE 3200
P.O. BOX 8749
DENVER, CO 80201

EXAMINER	
JACKSON, ANDRE K	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 01/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/905,761	CAMPBELL ET AL.	
	Examin r	Art Unit	
	André K. Jackson	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7,11,12,14 and 16-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7,11,12,14 and 16-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 7,11,12,14,17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woodhead et al. in view of Okulov.

Regarding claim 7, Woodhead et al. discloses an oscillator to provide a square wave voltage signal and a transmission line having an input and an output and a phase detector detecting a phase difference between the square wave voltage provided by the oscillator and the transmission line and the phase detector providing an output signal indicative of the phase difference caused by changes in moisture content of a medium surrounding the transmission line (Columns 2-5). What is not explicitly disclosed by Woodhead et al. is a semiconductor circuit being indicative of a logical exclusive OR function of signals applied to the first and second inputs of the circuit. However, Okulov discloses in "Water level alarm" a semiconductor circuit being indicative of a logical exclusive

OR function of signals applied to the first and second inputs of the circuit (Figure 7). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Woodhead et al. to include a semiconductor circuit being indicative of a logical exclusive OR function of signals applied to the first and second inputs of the circuit as taught by Okulov. By adding this feature the circuit would be able to output a signal dependent on the states of the sensors.

Regarding claim 11, Woodhead et al. disclose where a time domain reflectometry waveform is used to measure the phase difference (Column 2).

Regarding claim 12, Woodhead et al. disclose where a frequency domain waveform is used to measure the phase difference (Columns 2-4).

Regarding claim 14, Woodhead et al. disclose where insulating the transmission line form the bulk material being measured (Column 3).

Regarding claim 17, Woodhead et al. disclose where the semiconductor circuit has electrical traces on an elongated printed circuit boards (Columns 3-4).

Regarding claim 18, Woodhead et al. disclose where the semiconductor circuit has electrical traces on an elongated printed circuit board, and wherein the electrical traces on .the elongated printed circuit board sense a dielectric constant of the bulk materials based on the measured phase difference (Columns 3-4).

3. Claims 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufmann (AT 403213B) in view of Okulov.

Regarding claim 7, Kaufmann discloses an oscillator to provide a square wave voltage signal and a transmission line having an input and an output and a phase detector detecting a phase difference between the square wave voltage provided by the oscillator and the transmission line and the phase detector providing an output signal indicative of the phase difference caused by changes in moisture content of a medium surrounding the transmission line; a low pass filter and a semiconductor circuit (Figures 1-4). What is not explicitly disclosed by Kaufmann is a semiconductor circuit being indicative of a logical exclusive OR function of signals applied to the first and second inputs of the circuit. However, Okulov discloses a semiconductor circuit being indicative of a logical exclusive OR function of signals applied to the first and second inputs of the circuit (Figure 7). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kaufmann to include a semiconductor circuit being indicative of a logical exclusive OR function of signals applied to the first and second inputs of the circuit as taught by Okulov. By adding this feature the circuit would be able to output a signal dependent on the states of the sensors.

Regarding claim 12, Kaufmann disclose where a frequency domain waveform is used to measure the phase difference (Columns 2-4).

4. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufmann in view of Okulov as applied to claim 7 above, and further in view of Woodhead et al.

Regarding claim 11, Kaufmann does not explicitly disclose where a time domain reflectometry waveform is used to measure the phase difference. However, Woodhead et al. disclose where a time domain reflectometry waveform is used to measure the phase difference (Column 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kaufmann to include where a time domain reflectometry waveform is used to measure the phase difference as taught by Woodhead et al. By adding this feature the user would be able to accurately measure the dielectric constant.

5. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kaufmann in view of Okulov as applied to claim 7 above, and further in view of Numoto.

Regarding claim 16, Kaufmann does not explicitly disclose where the low pass filter has a resistor and a capacitor connected to the output of the semiconductor circuit producing a DC voltage proportional to the phase difference of the signal provided to the first and second inputs. However, Numoto disclose in "Portable soil moisture tester" where the low pass filter has a resistor and a capacitor connected to the output of the

semiconductor circuit producing a DC voltage proportional to the phase difference of the signal provided to the first and second inputs (Columns 5-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kaufmann to include where the low pass filter has a resistor and a capacitor connected to the output of the semiconductor circuit producing a DC voltage proportional to the phase difference of the signal provided to the first and second inputs as taught by Numoto. By adding this feature the apparatus would be able to provide a reading directly corresponding to the resistance of the soil.

6. Claims 7 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rauchwerger in view of Okulov.

Regarding claim 7, Rauchwerger discloses an oscillator to provide a square wave voltage signal and a transmission line having an input and an output and a phase detector detecting a phase difference between the square wave voltage provided by the oscillator and the transmission line and the phase detector providing an output signal indicative of the phase difference caused by changes in moisture content of a medium surrounding the transmission line; a low pass filter and a semiconductor circuit (Figures 1-4). What is not explicitly disclosed by Rauchwerger is a semiconductor circuit being indicative of a logical exclusive OR function of signals applied to the first and second inputs of the circuit. However, Okulov discloses a semiconductor circuit being indicative of a logical

exclusive OR function of signals applied to the first and second inputs of the circuit (Figure 7). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rauchwerger to include a semiconductor circuit being indicative of a logical exclusive OR function of signals applied to the first and second inputs of the circuit as taught by Okulov. By adding this feature the circuit would be able to output a signal dependent on the states of the sensors.

Regarding claim 12, Rauchwerger disclose where a frequency domain waveform is used to measure the phase difference (Columns 2-4).

7. Claims 11 and are rejected under 35 U.S.C. 103(a) as being unpatentable over Rauchwerger in view of Okulov as applied to claim 7 above, and further in view of Woodhead et al.

Regarding claim 11, Rauchwerger does not explicitly disclose where a time domain reflectometry waveform is used to measure the phase difference. However, Woodhead et al. disclose where a time domain reflectometry waveform is used to measure the phase difference (Column 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rauchwerger to include where a time domain reflectometry waveform is used to measure the phase difference as taught by Woodhead et al. By adding this feature the user would be able to accurately measure the dielectric constant.

Regarding claim 14, Rauchwerger disclose where insulating the transmission line form the bulk material being measured (Abstract).

8. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rauchwerger in view of Okulov as applied to claim 7 above, and further in view of Numoto.

Regarding claim 16, Rauchwerger does not explicitly disclose where the low pass filter has a resistor and a capacitor connected to the output of the semiconductor circuit producing a DC voltage proportional to the phase difference of the signal provided to the first and second inputs. However, Numoto discloses where the low pass filter has a resistor and a capacitor connected to the output of the semiconductor circuit producing a DC voltage proportional to the phase difference of the signal provided to the first and second inputs (Columns 5-6). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Rauchwerger to include where the low pass filter has a resistor and a capacitor connected to the output of the semiconductor circuit producing a DC voltage proportional to the phase difference of the signal provided to the first and second inputs as taught by Numoto. By adding this feature the apparatus would be able to provide a reading directly corresponding to the resistance of the soil.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to André K. Jackson whose telephone number is (703) 305-1522. The examiner can normally be reached on Mon.-Thurs. 7AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on (703) 305-4705. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

A.J.
January 20,2004

HEZRON WILLIAMS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800